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ON THE MOULTING PROCESS IN THE CRAY FISH.

We have extracted the following interesting notice from the elegant and valuable work of Prof. Rymer Jones*, which we had occasion to notice in one of our preceding numbers. "The phænomena which attend the renovation of the external skeleton are so unimaginable that it is really extraordinary how little is accurately known concerning the nature of the operation. The first question which presents itself is, how are the limbs liberated from their confinement? for, wonderful as it may appear, the joints even of the massive *chela* of the lobster do not separate from each other, but notwithstanding the great size of some of the segments of the claw, and the slender dimensions of the joints that connect the different pieces, the cast-off skeleton of the limb presents exactly the same appearance as if

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In a note annexed to this paragraph he describes the appearances of an *Astacus fluviatilis*, which he had obtained soon after casting its shell, and of its newly cast-off covering. "All the pieces of the exuvium are connected together by the old articulations, and accurately represent the external form of the complete animal; the *carapace*, or dorsal shield of the cephalo-thorax alone being detached, having been thrown off in one piece. The pedicles of the eyes and external corneae, as well as the antennae, remain *in situ*, the corresponding parts having been drawn out from them as the finger from a glove, and no fissure of the shell or rupture of the ligaments connecting the joints is anywhere visible in these portions of the skeleton. The ordinary tubercles, and the membrane stretched over the orifice of the ear, occupy the same position as in the living crayfish. The jaws, foot-jaws, and ambulatory feet retain their original connections, with the exception of the right *chela*, which had been thrown off before the moult began; and the segments of the abdomen, false feet, and tail-fin exactly resembled those of the perfect creature;—even the internal processes derived from the thoracic segments (*apodemata*) rather seemed to have had the flesh most carefully picked out from among them than to have been cast away from a living animal: but perhaps the most curious circumstance observable was, that attached to the base of each leg was the skin which had formerly covered the branchial tufts, and which, when floated in water, spread out into accurate representations of those exquisitely

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delicate organs. No fissure was perceptible in any of the articulations of the small claws, but in the chela each segment was split in the neighbourhood of the joints and the articulated ligaments ruptured. The lining membrane of the stomach was found in the thorax, having the stomachal teeth connected with it; from its position it would seem that the animal had dropped it into the place where it lay before the extrication of its limbs was quite accomplished. The internal tendons were all attached to the moveable joint of each pair of forceps, both in the chela and in the two anterior pairs of smaller ambulatory legs.

“ On examining the animal, which had extricated itself from the exuvium described above, the shell was found soft and flexible, but contained a sufficiency of calcareous matter to give it some firmness, especially in the claws. The tendons of the forceps were still perfectly membranous, presenting a very decided contrast when compared with the old ones affixed to the discarded shell. The stump of the lost chela had not as yet begun to sprout, and the extremity was covered by a soft black membrane. The jaws were quite hard and calcified, as likewise were the teeth contained in the stomach.”

METEOROLOGICAL OBSERVATIONS FOR AUGUST, 1839.

Chiswick.—Aug. 1. Fine. 2, 3. Hot. 4—6. Very fine. 7. Rain, with thunder at night. 8. Overcast and fine. 9—14. Very fine. 15. Hazy: drizzly. 16. Very fine: cloudy: rain at night. 17. Rain. 18. Very fine: heavy rain at night. 19. Rain. 20. Hazy: fine. 21. Clear and fine. 22—26. Very fine. 27. Overcast: slight rain. 28. Hazy. 29. Cloudy: rain at night. 30. Rain: fine. 31. Cloudy: rain.

Boston.—Aug. 1. Fine: rain early A.M. 2, 3. Fine. 4. Cloudy: rain P.M. 5, 6. Fine. 7. Rain. 8, 9. Fine. 10. Fine: rain P.M. 11. Rain. 12. Cloudy. 13. Fine. 14. Rain. 15. Fine. 16. Cloudy: rain early A.M.: rain, thunder and lightning P.M. 17. Fine: rain A.M. and P.M. 18. Fine. 19. Rain: extraordinary rain early A.M. 20. Cloudy: rain A.M. and P.M. 21, 22. Fine. 23. Cloudy. 24. Cloudy: rain early A.M. 25. Fine. 26. Cloudy. 27. Fine: rain early A.M. 28. Cloudy: rain P.M. 29. Cloudy. 30. Cloudy: rain early A.M. and P.M. 31. Rain: rain early A.M. and P.M.

Applegarth Manse, Dumfries-shire.—Aug. 1. Pleasant day: getting cloudy P.M. 2. Rain nearly all day. 3. Calm and temperate: cloudy P.M. 4. Fine clear day. 5. Fine: at noon sultry: air electrical. 6. Wet all day. 7. Occasional showers. 8. Fine: pleasant breeze: sky clear. 9. Slight rain A.M.: cleared up. 10. High wind: dry A.M.: showery P.M. 11. Fair and fine A.M.: showery P.M. 12. Dull, but fair. 13. Clear and calm all day. 14. Very wet from 11 A.M. 15. Damp and drooping all day. 16. Occasional drizzling all day. 17. Dry and partially clear. 18. Warm and close: showery P.M. 19. Drooping day. 20. Chill morning: fair: showery P.M. 21. Fair throughout: hoar frost A.M. 22. Fine day: heavy dew A.M. 23. Rain at noon and continued all day. 24. Drooping day. 25. Fair till afternoon: cloudy and close. 26. Fair throughout. 27. Beautiful harvest day. 28. Fair A.M.: came on heavy rain P.M. 29. Heavy rain: flood in the river. 30. Fine day: occasionally slight drizzle. 31. Very wet till 5 P.M., when it cleared.

Sun 27 days. Rain 18 days.

Wind southerly 18 days. Northerly 8 days. Westerly 4 days. Easterly 1 day.

Calm 15 days. Moderate 8 days. Brisk 4 days. Strong breeze 2 days. Boisterous 2 days.

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delicate organs. No fissure was perceptible in any of the articulations of the small claws, but in the chela each segment was split in the neighbourhood of the joints and the articulated ligaments ruptured. The lining membrane of the stomach was found in the thorax, having the stomachal teeth connected with it; from its position it would seem that the animal had dropped it into the place where it lay before the extrication of its limbs was quite accomplished. The internal tendons were all attached to the moveable joint of each pair of forceps, both in the chela and in the two anterior pairs of smaller ambulatory legs.

“ On examining the animal, which had extricated itself from the exuvium described above, the shell was found soft and flexible, but contained a sufficiency of calcareous matter to give it some firmness, especially in the claws. The tendons of the forceps were still perfectly membranous, presenting a very decided contrast when compared with the old ones affixed to the discarded shell. The stump of the lost chela had not as yet begun to sprout, and the extremity was covered by a soft black membrane. The jaws were quite hard and calcified, as likewise were the teeth contained in the stomach.”

METEOROLOGICAL OBSERVATIONS FOR AUGUST, 1839.

Chiswick.—Aug. 1. Fine. 2, 3. Hot. 4—6. Very fine. 7. Rain, with thunder at night. 8. Overcast and fine. 9—14. Very fine. 15. Hazy: drizzly. 16. Very fine: cloudy: rain at night. 17. Rain. 18. Very fine: heavy rain at night. 19. Rain. 20. Hazy: fine. 21. Clear and fine. 22—26. Very fine. 27. Overcast: slight rain. 28. Hazy. 29. Cloudy: rain at night. 30. Rain: fine. 31. Cloudy: rain.

Boston.—Aug. 1. Fine: rain early A.M. 2, 3. Fine. 4. Cloudy: rain P.M. 5, 6. Fine. 7. Rain. 8, 9. Fine. 10. Fine: rain P.M. 11. Rain. 12. Cloudy. 13. Fine. 14. Rain. 15. Fine. 16. Cloudy: rain early A.M.: rain, thunder and lightning P.M. 17. Fine: rain A.M. and P.M. 18. Fine. 19. Rain: extraordinary rain early A.M. 20. Cloudy: rain A.M. and P.M. 21, 22. Fine. 23. Cloudy. 24. Cloudy: rain early A.M. 25. Fine. 26. Cloudy. 27. Fine: rain early A.M. 28. Cloudy: rain P.M. 29. Cloudy. 30. Cloudy: rain early A.M. and P.M. 31. Rain: rain early A.M. and P.M.

Applegarth Manse, Dumfries-shire.—Aug. 1. Pleasant day: getting cloudy P.M. 2. Rain nearly all day. 3. Calm and temperate: cloudy P.M. 4. Fine clear day. 5. Fine: at noon sultry: air electrical. 6. Wet all day. 7. Occasional showers. 8. Fine: pleasant breeze: sky clear. 9. Slight rain A.M.: cleared up. 10. High wind: dry A.M.: showery P.M. 11. Fair and fine A.M.: showery P.M. 12. Dull, but fair. 13. Clear and calm all day. 14. Very wet from 11 A.M. 15. Damp and drooping all day. 16. Occasional drizzling all day. 17. Dry and partially clear. 18. Warm and close: showery P.M. 19. Drooping day. 20. Chill morning: fair: showery P.M. 21. Fair throughout: hoar frost A.M. 22. Fine day: heavy dew A.M. 23. Rain at noon and continued all day. 24. Drooping day. 25. Fair till afternoon: cloudy and close. 26. Fair throughout. 27. Beautiful harvest day. 28. Fair A.M.: came on heavy rain P.M. 29. Heavy rain: flood in the river. 30. Fine day: occasionally slight drizzle. 31. Very wet till 5 P.M., when it cleared.

Sun 27 days. Rain 18 days.

Wind southerly 18 days. Northerly 8 days. Westerly 4 days. Easterly 1 day.

Calm 15 days. Moderate 8 days. Brisk 4 days. Strong breeze 2 days. Boisterous 2 days.